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THE FOREST SITUATION IN SCHUYLKILL AND CARBON COUNTIES

PENNSYLVANIA

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This is the third of a series of seven brief reports on the forest condition in the counties of the Anthracite Forest Region. This region includes 15 counties shown on the map on the back of this publication, which contain or surround the hard-coal deposits of Pennsylvania. Because of basic similarities, Schuylkill and Carbon Counties are treated together. The purpose is to present tabular data from the Anthracite Forest Survey for local use, together with enough general information about the two counties to make the forest situation understandable. Forest areas and present condition of the forest were determined through interpretation of aerial photographs, and the distribution of the major forest types was ascertained largely by reconnaissance. Data on species, size-classes, volume, and growth applicable to the several forest types and condition classes were collected by detailed field surveys.

Acknowledgment is made to John A. Buttrick and Donald F. Robinson for aid in compiling and writing the report, and to Robert Bartlett for preparation of charts and maps.

FOREST SITUATION IN SCHUYLKILL AND CARBON COUNTIES

PENNSYLVANIA

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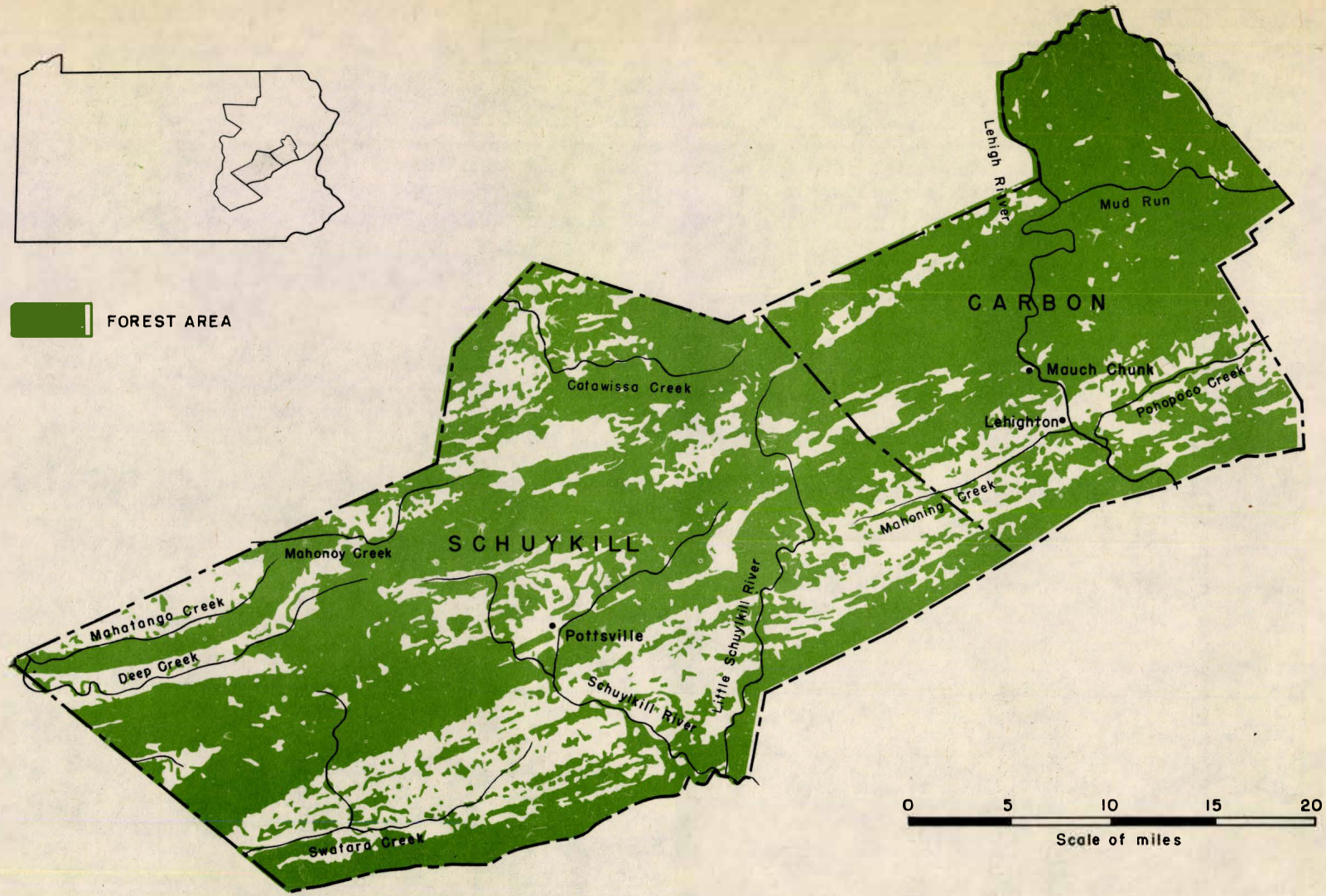

FIGURE 1. – FOREST AREA IN SCHUYLKILL & CARBON COUNTIES OF PENNSYLVANIA

THE FOREST SITUATION IN SCHUYLKILL AND CARBON COUNTIES

Schuylkill and Carbon Counties include the most devastated forests of the Anthracite Region. Mine waste banks and strippings, severe erosion, scarcity of merchantable timber, and large areas of scrub oak are characteristic of much of the area of these two counties. On the other hand, there is considerable good agricultural land and many acres of potentially-productive forest.

General Description

Schuylkill and Carbon Counties are made up of two distinct areas. The northern two-thirds is ridge country. The southern third is an uneven valley, spotted with hills and ridges, lying between Blue Mountain and the highlands to the north. The total area of the two counties is 1188 square miles or 760,320 acres.

The ridge and valley country in the north, which rises to a height of over 2200 feet in the northeast portion of Carbon County, is like a series of long fingers extending in a southwesterly direction from the Pocono highlands of Monroe County. The high country in Carbon County is covered with virtually unbroken forest land, most of it in relatively poor condition. From western Carbon to the western boundary of Schuylkill the ridges are underlain with tilted veins of coal. Parts of the eastern and western middle coal fields and virtually all of the southern field lie within these two counties. Sections in northern and northwestern Schuylkill, a narrow strip of hill and valley country that extends from the Lehigh River at Rockport to a point a few miles south of Mahanoy City, and the Blue Mountain Valley are largely devoted to farming, with here and there a manufacturing town and many small tracts of forest.

Most of the drainage of these counties is by short creeks running northeast or southwest into two southward-flowing rivers that cut their way through the ridges and Blue Mountain, and flow south and east to the Delaware. The easternmost of these rivers, the Lehigh, which drains Carbon County, forms the northeast boundary of that county and then swings in a wide arc to the south, carving out a sharp, deep, twisting gorge in which landslides and floods are frequent. Much of Schuylkill County is drained by various branches of the Schuylkill River. Northern and western Schuylkill County is drained by the upper courses of creeks flowing to the Susquehanna, the most important being the Swatara in the southwest and the Catawissa in the north.

Transportation

Industrial transportation in this region was at first by water. In 1827-1829 a canal was built for transporting coal along the Lehigh River from Mauch Chunk to Easton. Later many short railway lines were built throughout the coal-field area. At the present time, except in the northern part of Carbon County, where there are no railways and but few roads, transportation facilities are good. The principal railroad is the Reading, with service to the East, West, and South. The Pennsylvania crosses Schuylkill County. The mainlines of the New Jersey Central and Lehigh Valley Railroads follow up the Lehigh River, and branches serve parts of Schuylkill. Freight service is excellent; passenger service, only fair. There are also over 800 miles of improved State highway and many miles of rural roads. Bus lines provide passenger service to all important urban centers throughout the region.

Population

The population of the two counties in 1940 was 290,066, a loss of 8819 since 1930, when this region achieved its maximum population. The greatest proportion of this number is urban. Pottsville, the county seat of Schuylkill County, is a city of 24,530. Three boroughs in Schuylkill County have more than 10,000 inhabitants each, Shenandoah, Mahonoy City, and Tamaqua. There are eleven other boroughs of more than 5000 and many smaller ones. Less than 8 percent of the total population (16,222 persons) lives on farms, three quarters of them in Schuylkill County.

Occupations

The principal occupation in these two counties is the mining of anthracite. In 1940 there were 47 mines with a total employment of nearly 21,000 and an output of 13,400,000 tons valued at $51,896,300. In recent years strip-mining and the reclamation of coal from waste banks have supplemented deep mining to a considerable degree. In 1943 one quarter of the total production was by strip-mining and one quarter by bank reclamation.

The commercial mining of coal in this area goes back to 1791, when the Lehigh Navigation Coal Company was founded. At first, mining was carried on in a small way only. But with the building of the Lehigh River Canal, large-scale transportation of coal from the eastern middle field was made possible. For the next ninety years the production of coal increased steadily, far surpassing agriculture and lumbering as a means of livelihood, and bringing in labor in large quantities. The many congested settlements in western Carbon and throughout the central and northern parts of Schuylkill bear testimony to the influence of the mining industry on the whole social and economic life of these two counties.

Coal production reached its peak in 1917. During the thirty years since then the history of these counties, and especially of Schuylkill, has been characterized by the decline of this industry. As the years have gone by, more and more people, dependent on the mines for jobs, have found themselves without work. In 1940, 35,000 workers, 31 percent of the total labor force, were jobless; and though this unemployment was partly due to the general economic depression, the decline in the mining industry was nevertheless the chief cause, either directly or indirectly, of the situation.

Wherever a heavy industry, such as mining, is established, the textile industry is likely to be found also. The comparative lightness of the work and the comparatively low market value of the products of this industry have regularly resulted in its employing a high percentage of women. It has therefore established itself where it could draw for its labor personnel on the wives and daughters of men otherwise employed. In Carbon and to a greater degree in Schuylkill County this has taken place. In 1940 there were 84 textile factories employing upwards of 10,000 persons, with an output valued at $20,823,700.

One other manufacturing industry of importance is established in this section, the metal products industry. There are a number of small iron and steel-using concerns in Weatherly and at various points in Schuylkill County. One large concern, a zinc company with two plants in Palmerton, provides the bulk of the employment. Altogether, in 1940, 18 metal manufacturing plants were in operation, with a total employment of nearly 3,700 and an output valued at $16,555,600.

The total manufacturing output for Schuylkill and Carbon Counties amounted to $61,690,900 in 1940. Three hundred and seventy plants were in operation and 19,246 persons employed[1/].

In the last five years, mining and the various manufacturing industries have expanded production. Between 1940 and 1942 the coal output increased from thirteen million to sixteen million tons. During the same period the output of the manufacturing industries increased in value by nearly 50 percent. The number employed has also been increased to some extent, the greatest increase being in the metal manufacturing industry. Schuylkill and Carbon Counties are the only sections of the Anthracite Region where employment in mining as well as output of coal increased between 1940 and 1942.

1/ Tenth Industrial Directory of the Commonwealth of Pennsylvania; Dept. of Industrial Affairs; compiled by the Bureau of Statistics, Harrisburg 1941.

The earliest development of these counties was agricultural. During the eighteenth century the land was cleared and farms established in the Blue Mountain Valley, and at a somewhat later date in the fertile creek valleys of northern and western Schuylkill. To this day farming remains the principal occupation of these sections. In 1940 only 16 percent of the land area (124,000 acres) was in cropland. On the whole, however, this land is average or better, and the Hegins Valley in northwest Schuylkill prides itself on its superior farmland. Poultry, livestock, grain, hay, and vegetables are the chief products. Altogether there are about 2,700 farms, and the annual farm income totals about $5,300,000 (1939). In addition, a number of persons derive a seasonal income from picking the blueberries that grow in the ridge country and are especially plentiful in the northern portion of Carbon County. Also much of the better timber is in farm woodlands; and this provides additional income to the farmers.

OCCUPATIONS OF POPULATION: 2/

Total population		290,066	
Not in labor force		177,080	61%
In labor force		112,986	39%
Unemployed		35,315	31%
Employed		77,671	69%
Trade and service		27,274	35%
Coal mining		23,491	30%
Manufacturing			
Metal	3169)		
Textile	8367)		
Food	1221)	15,622	20%
Other	2865)		
Transportation		5,199	7%
Agriculture		3,267	4%
Construction		2,221	3%
Forest products industries			
Forestry	33)		
Logging	126)		
Milling	151)	505	1%
Wood manufacture	58)		
Paper manufacture	137)		
Quarrying and other mining		92	*

*negligible

2/ This table, based on the U. S. Census for 1940, indicates the primary occupations of the residents of Schuylkill and Carbon Counties. The

Forest Description

Settlers began cutting off the forests for farmland in the valleys in the latter part of the eighteenth century. In the middle of the nineteenth, commercial lumbering began. The considerable quantities of white pine were first removed, then hemlock was felled for tanning bark, and finally hardwoods for lumber. After 1900 the rapid expansion of mining brought about an increasing demand for mine timbers, and second- and even third-growth stands have been clear-cut to meet this demand.

Forest area

Seventy-two percent of the gross area of Schuylkill and Carbon Counties is forested (fig. 1)3/. Northern Carbon is almost entirely covered with forest, and the coal region of Schuylkill and eastern Carbon is largely in forest also. In the Blue Mountain valley and the valleys in the northern and western sections of Schuylkill are numerous scattered tracts, many of them farm woodlands. Over 95 percent of the forest land in the two counties is in tracts of 50 acres or larger4/.

	SCHULYKILL		CARBON	
	Acres	Percent	Acres	Percent
Forest land	344,000	69	204,900	79
Nonforest	157,900	31	55,100	21
Gross area	501,900	100	260,000	100

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figures given in the text, on the other hand, are based on the employment provided by industries located within these counties. Discrepancies are due to the fact that many people live in one area and work in another.

3/ Maps showing the location of all forest tracts are available in a scale of 1" = 1 mile for each county; similar map showing forest condition is also available for Schuylkill County. These maps may be ordered through the Northeastern Forest Experiment Station, 614 Bankers Securities Building, Philadelphia 7, Pa. A postal or express money order, draft, or check made out to the Treasurer of the United States, covering the full amount, should accompany the order. Prints will be forwarded from the Forest Service, Division of Engineering in Washington, D. C. Each map will cost: Schuylkill County $0.68, Carbon County $0.40.

4/ For detailed tables see Appendix.

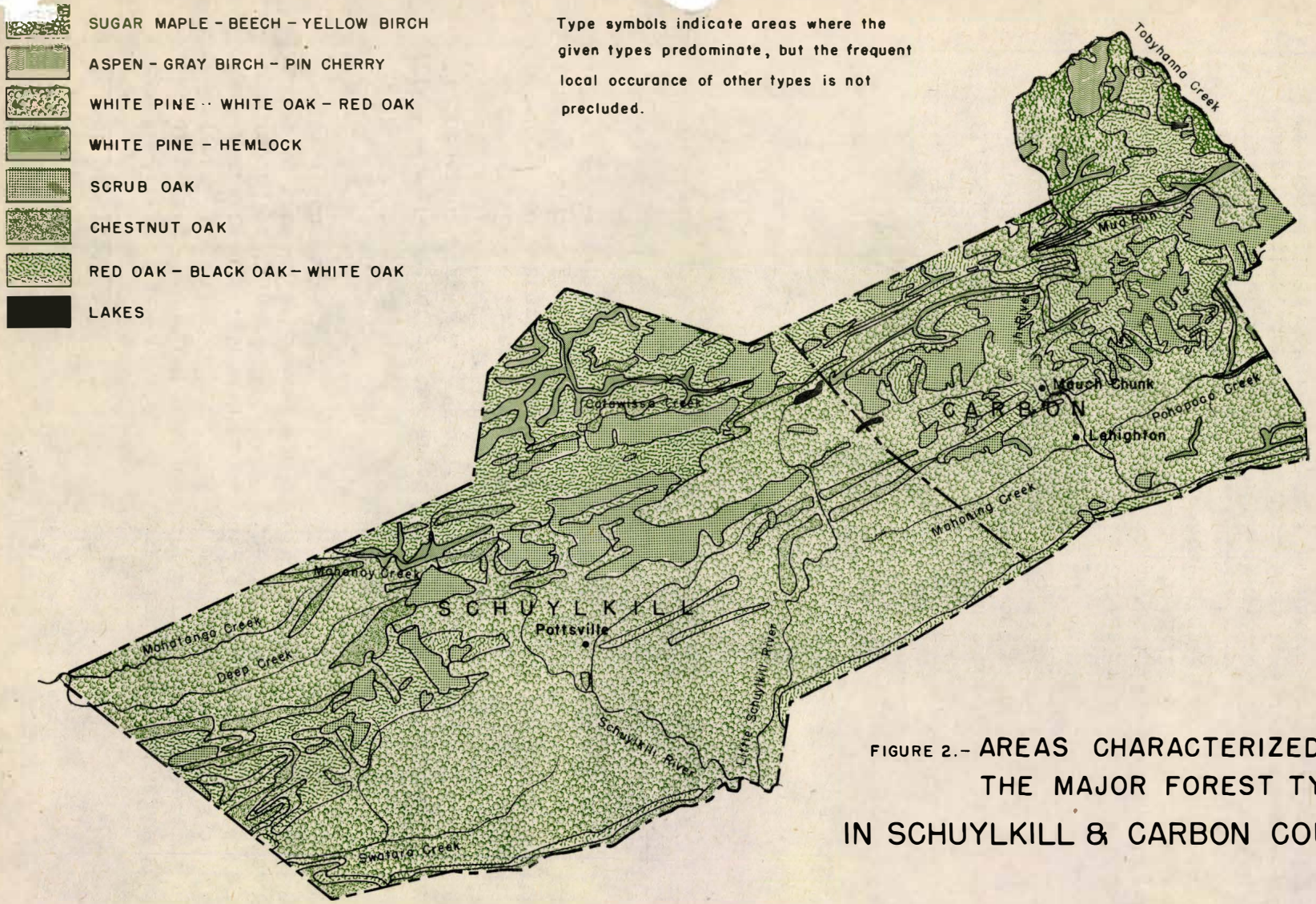


FIGURE 2.- AREAS CHARACTERIZED BY THE MAJOR FOREST TYPES IN SCHUYLKILL & CARBON COUNTIES

Forest types

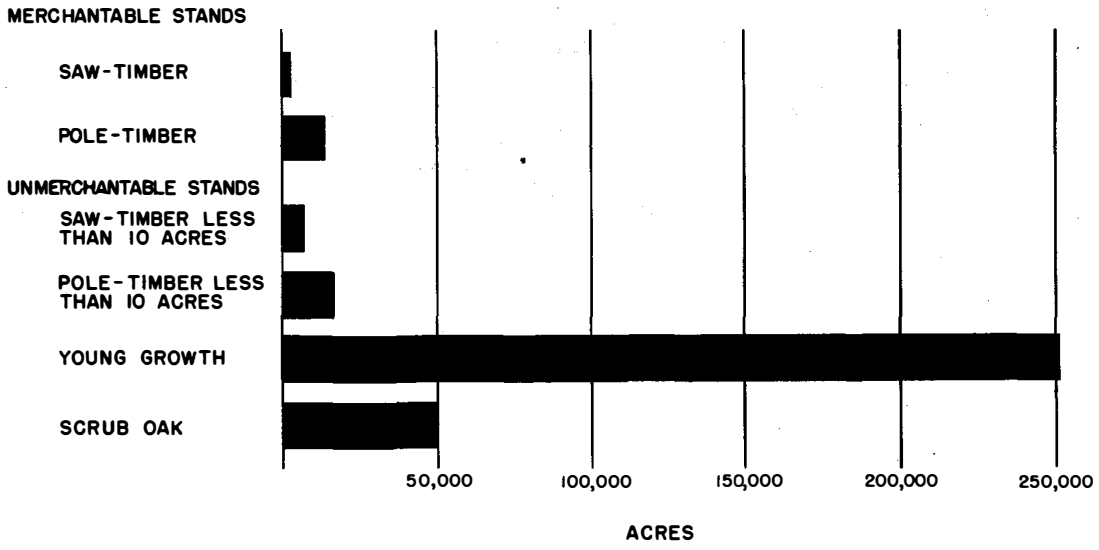
The natural forest cover of the bulk of this region is the white pine - white oak - red oak type, with white pine and hemlock in the creek bottoms (fig. 2). As the land becomes higher and poorer, these types give way to the red oak - black oak - white oak type, to chestnut oak, and finally to scrub oak. It is probable that many of the high open hilltops have always been in scrub oak, but the extent of that type has been greatly increased by fire. In the northern part of Carbon County there is a small area of northern hardwoods (sugar maple - beech - yellow birch), a large proportion of which has been reduced by fire to the aspen - gray birch and pin cherry.

Forest condition

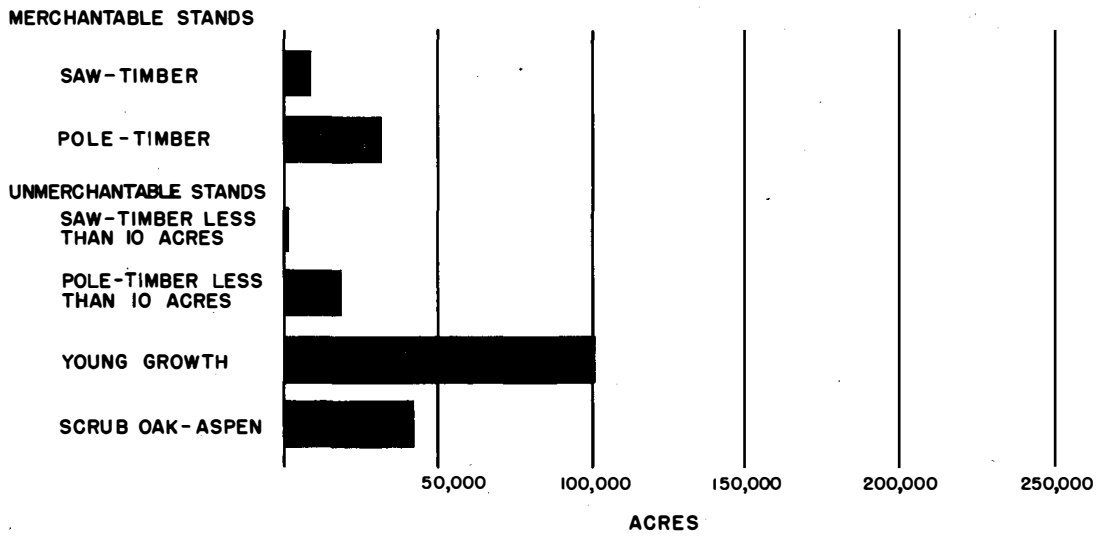
On the whole the forests of this area are in extremely poor condition. Lumbering for saw timber and to meet the demands of the mining industry have between them cut off all the virgin timber and considerable quantities of second- and even third-growth stock. Furthermore this lumbering has been a clear-cutting process and in many instances has been followed by devastating fires. In 1923, for example, 13 percent of the total area of Schuylkill County was burnt over. As a result, these forests contain only 140 million cubic feet of standing timber--270 cubic feet to the acre on the average--and less than 59 million board feet of merchantable saw timber. Nearly a sixth of the entire forest area is in scrub oak, and a large proportion of the rest is stocked with timber too young to be as yet of commercial value. Moreover, much of the land surface is scarred with strippings and piled with waste banks where the dominant industry of mining has taken its toll. Altogether nearly 90 percent of the forest land is unmerchantable (fig. 3)5/.

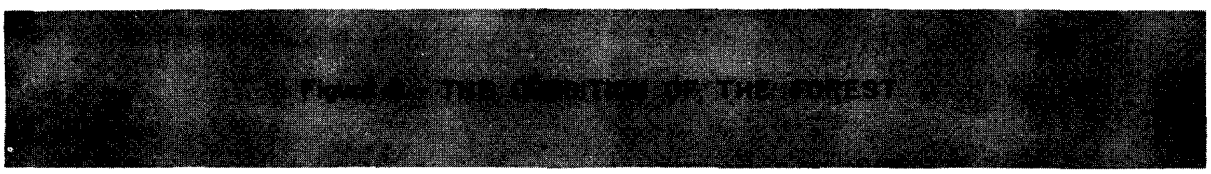
5/ The condition classes recognized are: 1. Saw-timber stands: stands of 10 acres or larger, each acre of which contains at least 2000 board feet of saw timber. 2. Pole-timber stands: stands of 10 acres or larger, each acre of which contains a minimum volume of approximately 5 standard cords in trees 5.0 inches diameter breast high (hereafter denoted by the initials d.b.h.) and larger, and less than 2000 board feet of saw timber. 3. Unmerchantable stands: areas of forest land which contain less than the minimum volume for pole-timber stands, plus stands of saw timber and pole timber of less than 10 acres in extent, whether isolated tracts or stands within larger forest areas.

SCHUYLKILL COUNTY



CARBON COUNTY





Timber volume

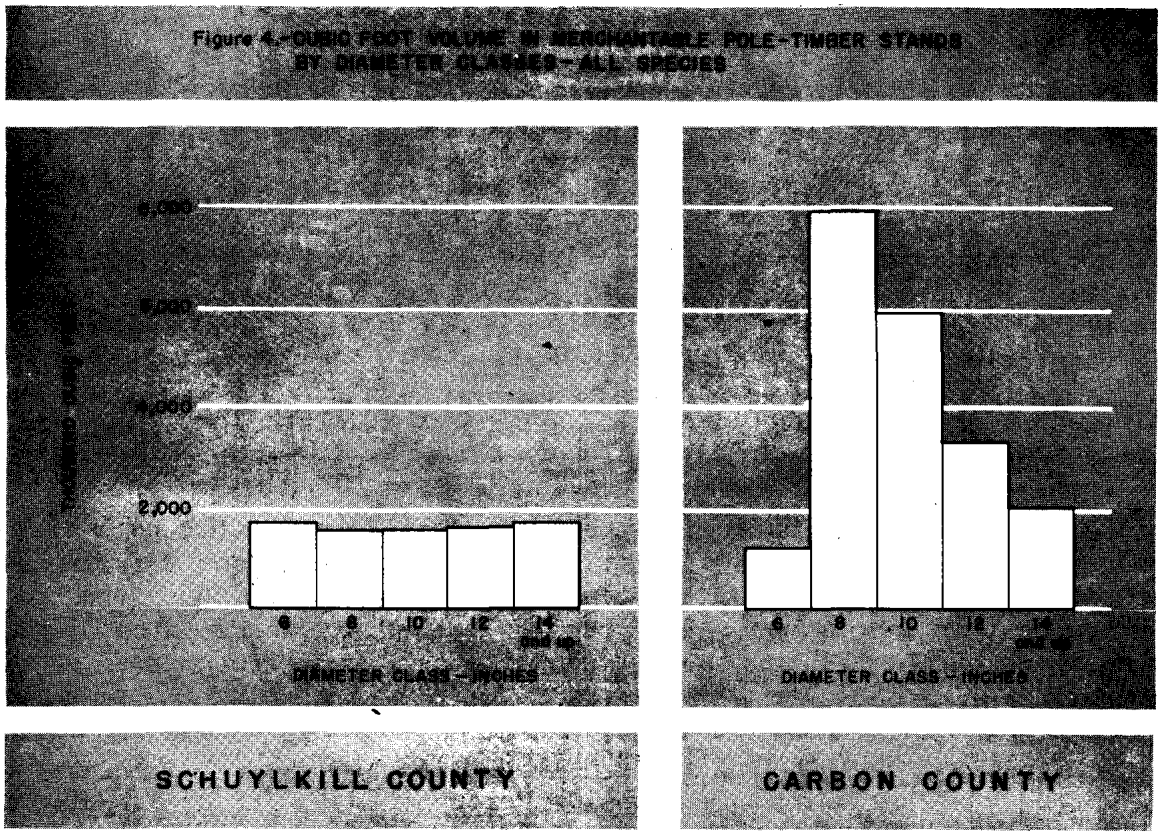
The volume of saw timber and the green weight of all timber are shown in the following table[6/]:

	SCHUYLKILL		CARBON	
	Saw timber	Total green weight	Saw timber	Total green weight
	M bd.ft.	Tons	M bd.ft.	Tons
Saw-timber stands	17,400	147,000	41,400	394,900
Pole-timber stands	16,200	215,800	25,300	571,800
Unmerchantable stands	67,200	1,434,800	30,900	887,700
Total	100,800	1,797,600	97,600	1,854,400

The distribution of the cubic-foot volume in the merchantable pole-timber stands by tree size may be seen in figure 4. The oaks account for well over half the green weight of all timber. In Schuylkill County the conifers are next in importance. In Carbon the other hardwoods, such as red maple, black birch, yellow poplar, and white ash, rank second.

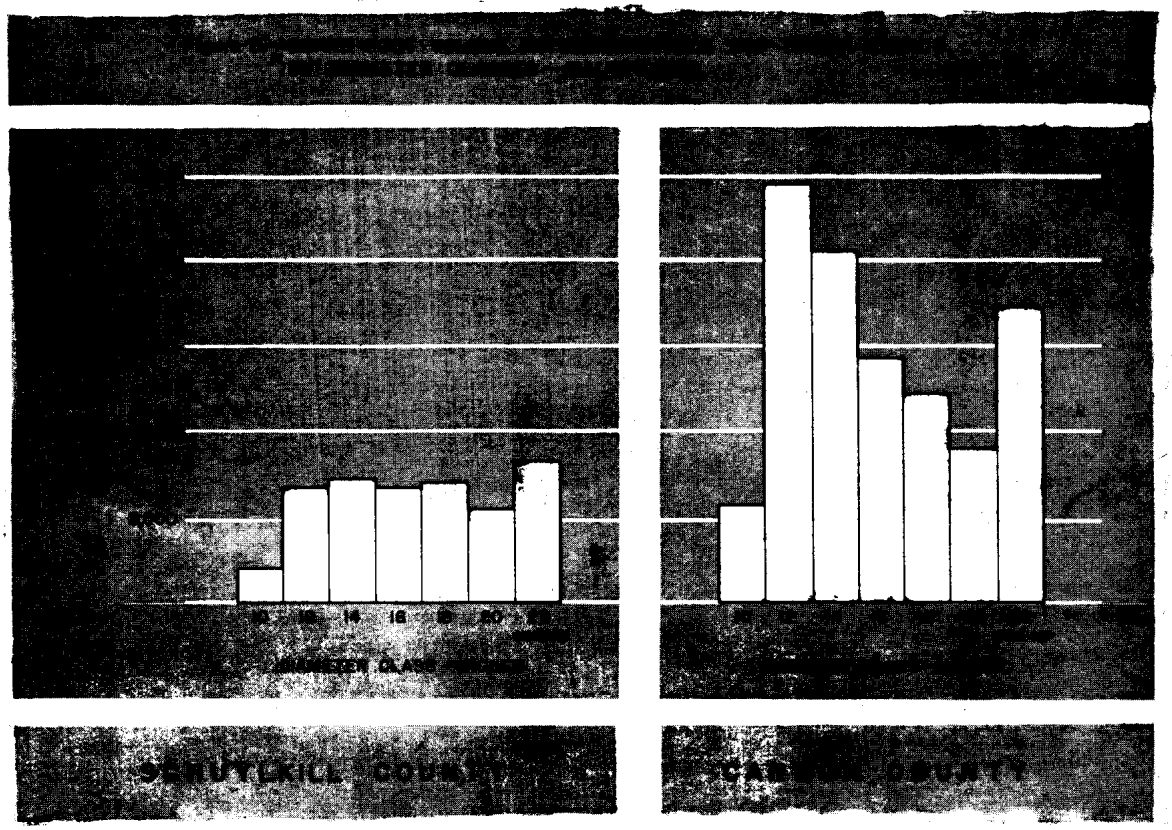
	SCHUYLKILL		CARBON	
	Tons	Percent	Tons	Percent
Conifers	61,900	29	99,100	17
Oaks, hickory, sugar maple	128,800	60	329,900	58
Other hardwoods	25,100	11	142,800	25
Total	215,800	100	571,800	100

6/ Saw-timber volume is the net board foot of sawlog-size material in conifers 9.0 inches d.b.h. and larger, plus the net volume of sawlog-size material in hardwoods 11 inches d.b.h. and larger. Board foot volumes were based on the International 1/4" log rule, which closely approximates green lumber tally. Deductions were made for cull. Total green weight is the weight of all trees 5.0 inches and larger, including bark and the tops and limbs to a 4-inch diameter. This was computed in cubic feet and converted to tons (green weight) by the application of cubic foot-per-ton factors, varying by species groups and averaging about 35 cubic feet per ton.



Over 70 percent of the area in saw-timber stands is located in Carbon County, and in both counties this area is largely in young trees. Over half of the saw-timber stands average less than 4,000 board feet to the acre:

	SCHUYLKILL		CARBON	
Thousand Board Feet per Acre	Acres	M bd.ft.	Acres	M bd.ft.
8 and more	600	6,200	1,200	11,500
6 to 8	300	2,200	1,300	7,900
4 to 6	1,000	4,500	2,000	8,500
2 to 4	1,900	4,500	5,100	13,500
Total	3,800	17,400	9,600	41,400



The species distribution in the saw-timber stands is quite different from that in the pole-timber stands. Nearly half the saw-timber volume in these stands is in conifers, and the oaks account for only about a third:

	SCHUYLKILL		CARBON	
	M bd.ft.	Percent	M bd.ft.	Percent
Conifers	8,500	49	19,300	47
Oaks, hickory, sugar maple	6,600	38	13,700	33
Other hardwoods	2,300	13	8,400	20
Total	17,400	100	41,400	100

The distribution of this volume in saw-timber stands by tree size may be seen in figure 5.

Current forest growth

The following tables show the total timber growth and the saw-timber growth of the different condition classes in the two counties:

1943

Total timber growth

	SCHUYLKILL	CARBON
	M cu.ft.	M cu.ft.
Saw-timber stands	202	514
Pole-timber stands	473	1,211
Unmerchantable stands	4,497	2,590
Total timber growth	5,172	4,315

Saw-timber growth

	M bd.ft.	M bd.ft.
Saw-timber stands	730	1,810
Pole-timber stands	1,240	2,000
Unmerchantable stands	4,560	2,070
Total saw-timber growth	6,530	5,880

Forest Products Industries

Although at one time lumbering was a leading industry, at present it is relatively unimportant. In 1942 there were 36 active sawmills, which produced a total of about 6.5 million board feet of lumber. The number of these mills by production classes is shown in the following table:

Production class	SCHUYLKILL	CARBON
Thousand board feet	Number of mills	
Idle	7	1
1 to 50	12	3
50 to 500	13	1
500 to 1000	2	1
Over 1000	2	0
Total	36	6

The principal wood requirement of Schuylkill and Carbon Counties is for mine timbers, and some cutting of mine timbers is being done. The local timber resource is, however, so greatly reduced that only a very small percentage of the requirements can be met within the two counties.

Wood-using manufactures are few. There are 11 planing mills employing a total of 29 persons, 4 furniture factories with 11 employees altogether, and 4 other small plants with a total employment of 10 persons.

Forest Land Ownership

About 16 percent of the forest land in Schuylkill and Carbon Counties is publicly owned. The Federal Government owns a tract near White Haven, the Hickory Run recreational area, which is to be turned over to the State for administration after its development has been completed. The State Game Commission controls several sizeable tracts in northern Carbon and scattered areas in Schuylkill. The State also owns a small plot in eastern Carbon which is administered by the Department of Forests and Waters. The greater part of the public forest land in Schuylkill and Carbon Counties belongs to the counties or is community-owned. Nineteen percent of the total forest area belongs to coal companies, most of it in Schuylkill County. Of the rest, 4 percent is owned by water companies, 10 percent by farmers, and about 51 percent by other private owners. The ownership distribution of the forest land in the two counties is as follows:

	SCHUYLKILL Acres	CARBON Acres
Public ownership		
Federal	--	13,400
State (Department of Forests and Waters)	--	600
State Game Commission	9,600	9,100
County	28,700	12,200
Community	14,200	--
Total public ownership	52,500	35,300
Private ownership		
Coal companies	101,100	5,600
Water companies	16,900	4,800
Farmers	37,400	18,300
Others	136,100	140,900
Total private ownership	291,500	169,600

Outlook in Brief

The depleted state of the forests in these two counties is largely due to their economic importance. The mining industry has needed large quantities of timber, much of it in small sizes. As a consequence the

forests are usually stripped as soon as they reach mine-timber size, and so, seldom have a chance to grow into saw-timber. From the point of view of maximum returns this is wasteful management. Much of the country naturally bears a considerable proportion of white pine which, if allowed to mature, makes valuable lumber. And there are many specialized uses for mature oak--furniture, flooring, cooperage--from which the returns are much higher than from lagging and mine timbers.

The principal measures required to attain productive forests are:

1. Increased prevention and control of forest fires is prerequisite to any attempt at forest improvement in this area. The State Department of Forests and Waters has made some progress in its efforts to control forest fires in this area but fires still burn over far too large an acreage annually. Additional access roads and equipment are needed. A well-planned educational program would do much to win the support of the populace, without which fire-prevention programs are useless. And an increased fire detection and control organization, possibly made up of volunteers, that could be active during periods of high hazard in the spring and fall would make possible the reduction of fire damage to a minimum.

2. Forest management practices must be greatly improved. Thinnings and improvement cuttings can produce a considerable proportion of the mine-timber requirements. The better trees, both pines and hardwoods, would thus have a chance to grow into valuable timber. The practice of clear cutting the forest stands as soon as they will provide mine timbers should be stopped.

3. Planting will hasten the development of productive forests. So depleted are the forests in this area that restoration of them by natural means could profitably be supplemented by planting. In particular the proportion of white pine could be increased in this way. And such of the scrub oak stands as are on good sites might also be planted to hasten their restoration to productivity. This planting, however, should not be indiscriminate. Many acres in eastern Schuylkill and central Carbon are probably too poor sites to justify the expense of planting them.

Planting mine waste banks and strippings should also be considered. This is not in the strictest sense a forest-improvement measure. Commercial timber will not grow for many years to come on these areas. Nevertheless, the erosion of silt into streams and the blowing of dust from these banks have such detrimental effects that the stabilization of them by planting is well worth careful consideration. Steps are being taken to reduce the silting of coal into the Schuylkill River.

Planting for watershed protection, especially in the Lehigh Valley, would also be a worthwhile item on the forest agenda. The speed of flood run-off and, in the more precipitous areas, the danger of

landslides and erosion would be lessened if there were adequate forest cover. The Lehigh Valley Flood Control Council has included forestry measures as an important part of its flood-control program.

4. Public ownership should gradually be increased. Large areas of forest land in these two counties, especially in the coal fields, are too poor in site quality to justify continued private ownership. Restoration of depleted forests requires many years, thus making private ownership unattractive. The coal companies are primarily interested in the subsurface coal resources. The surface resources have suffered the consequences and it is doubtful if these can be restored to full productivity unless they are brought under public administration. Public agencies can develop these forest areas, first, for game production, second, for recreation, and, finally, for timber production. Such ownership and development will assure maintenance of excellent watersheds at the headwaters of streams.

APPENDIX

Tables 1 to 9 - Schuylkill County

Tables 1 to 9 - Carbon County

SCHUYLKILL COUNTY

Table 1.--Land use

Land use	Area	Proportion of class	Proportion of gross area
	Acres	Percent	Percent
Forest 1/			
Tracts less than 10 acres	4,000	1.2	0.8
Tracts 10 up to 50 acres	10,000	2.9	2.0
Tracts 50 acres and over	330,000	95.9	65.7
All forest land	344,000	100.0	68.5
Nonforest			
Cropland 2/	95,300	60.3	19.0
Mine waste	20,400	12.9	4.1
Water 2/	400	0.3	0.1
Other	41,800	26.5	8.3
All nonforest land	157,900	100.0	31.5
Gross	501,900	100.0	100.0

1/ Based on aerial photographs taken in 1938 - 1939.

2/ Bureau of the Census, 1940.

Table 2.--Forest area by minor civil divisions

Civil division 1/	Gross area	Nonforest area	Forest area	Proportion gross area in forest	Proportion of county forest land
	Acres	Acres	Acres	Percent	Percent
Barry t.	12,500	4,700	7,800	62.4	2.3
Blythe t., Middleport, b., New Philadelphia b.	19,700	1,800	17,900	90.7	5.2
Branch t., Minersville b.	7,700	1,300	6,400	83.4	1.9
Butler, t., Ashland b.,2/ Girardville b.,Gordon b.	16,700	3,600	13,100	78.3	3.8
Cass t.	9,000	1,600	7,400	82.4	2.1
Delano t.	4,900	500	4,400	90.2	1.3
E. Brunswick t., New Ringgold b.	20,400	9,000	11,400	56.0	3.3
E. Norwegian t., Mechanicsville b., Paolo Alto b., St. Clair b., Port Carbon b.	4,800	1,900	2,900	60.3	0.8
E. Union t.	16,400	3,300	13,100	80.0	3.8
Eldred t.	14,900	7,400	7,500	50.5	2.2
Foster t.	8,200	400	7,800	95.2	2.3
Frailey t.	5,900	100	5,800	98.7	1.7
Hegins t.	20,200	5,400	14,800	73.1	4.3
Hubley t.	8,600	4,300	4,300	50.2	1.2
Kline t., McAdoo b.	8,100	1,700	6,400	79.5	1.9
Mahanoy t., Mahanoy City b.	14,900	4,600	10,300	68.8	3.0
New Castle t.	7,800	400	7,400	94.3	2.1
N. Manheim t., Mt. Carbon b., Cressona b., Schuylkill Haven b.	15,300	6,900	8,400	54.9	2.4
N. Union t.	13,500	4,000	9,500	70.0	2.8
Norwegian t., Pottsville c.	6,200	2,400	3,800	61.6	1.1
Pine Grove t., Pine Grove b.	25,100	8,100	17,000	67.7	4.9
Porter t., Tower City b.	11,800	2,000	9,800	83.2	2.9
Rahn t., Coaldale b.	6,800	1,000	5,800	84.6	1.7
Reilly t.	10,400	500	9,900	95.5	2.9
Rush t.	15,500	4,600	10,900	70.4	3.2
Ryan t.	11,300	2,700	8,600	76.2	2.5
Schuylkill t., Tamaqua b.	7,400	1,000	6,400	86.8	1.9
S. Manheim b., Auburn b., Landingville b.	15,200	6,500	8,700	57.1	2.5
Tremont t., Tremont b.	15,600	500	15,100	96.7	4.4
Union t., Ringtown b.	14,500	5,900	8,600	59.2	2.5
Upper Mahantango t.	9,500	6,300	3,200	34.0	0.9

SCHUYLKILL
Table 2.--Forest area by minor civil divisions

Civil Division 1/	Gross area	Nonforest area	Forest area	Proportion gross area in forest	Proportion of county forest land
	Acres	Acres	Acres	Percent	Percent
Walker t.	14,300	3,300	11,000	77.0	3.2
Washington t.	20,200	10,500	9,700	48.0	2.8
Wayne t.	22,100	10,600	11,500	51.8	3.3
W. Brunswick t., Deer Lake b., Port Clinton b., Orwigsburg b.	22,000	10,800	11,200	51.0	3.3
W. Mahanoy t., Shenandoah b., Frackville b., Gilberton b.	7,400	3,300	4,100	55.3	1.2
W. Penn t.	37,100	15,000	22,100	59.6	6.4
All civil divisions	501,900	157,900	344,000	68.5	100.0

1/Abbreviations: t. - township, b. - borough, c. - city.

2/Includes only that part of Ashland b. that is in Schuylkill County.

Table 3.--Forest area by forest types and conditions

Forest type	Saw-timber stands		Pole-timber stands		Unmerchantable stands		All stands	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
White pine - hemlock	200	5.3	400	2.9	5,600	1.7	6,200	1.8
White pine - red oak - black oak	3,100	81.6	9,700	69.2	152,800	46.9	165,600	48.2
White oak - red oak - black oak	300	7.9	2,600	18.6	81,300	24.9	84,200	24.5
Chestnut oak	100	2.6	1,100	7.9	34,700	10.6	35,900	10.4
Scrub oak	--	--	--	--	50,000	15.3	50,000	14.5
Other	100	2.6	200	1.4	1,800	0.6	2,100	0.6
All types	3,800	100.0	14,000	100.0	326,200	100.0	344,000	100.0

Table 4.--Volume by forest types

Forest type	Saw-log volume M bd.ft.	Total volume M cu. ft.
Sugar maple - beech - yellow birch	--	--
Aspen - gray birch - pin cherry	--	--
White pine - hemlock	4,500	2,120
White pine - white oak - red oak	66,200	45,140
Red oak - black oak - white oak	22,400	16,510
Chestnut oak	5,800	4,960
Scrub oak	900	1,700
Other	1,000	900
All forest types	100,800	71,330

Table 5.--Forest area by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Area	Proportion of each condition	Proportion of total forest land
	Acres	Percent	Percent
Merchantable:			
Saw-timber stands 1/ (bd. ft. per acre)			
8,000 and over	600	15.8	0.2
6,000 to 7,999	300	7.9	0.1
4,000 to 5,999	1,000	26.3	0.3
2,000 to 3,999	1,900	50.0	0.5
All saw-timber stands	3,800	100.0	1.1
Pole-timber stands 2/ (cords per acre)			
10.0 and over	2,200	15.7	0.6
5.0 to 9.9	11,800	84.3	3.5
All pole-timber stands	14,000	100.0	4.1
All merchantable stands	17,800		5.2
Unmerchantable:			
Saw-timber stands less than 10 acres	7,000		2.3
Pole-timber stands less than 10 acres	17,400		5.0
Young growth stands	251,800		73.1
Scrub oak stands	50,000		14.4
All unmerchantable stands	326,200		94.8
All forest land	344,000		100.0

1/ In stands 10 acres or larger each acre of which has at least 2,000 board feet (lumber tally).

2/ In stands 10 acres or larger each acre of which has at least 5 cords (400 cubic feet), but less than 2,000 board feet.

Table 6.--Volume by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Saw-timber volume (lumber tally) 1/		Total volume (including bark)			
	M bd.ft.	Percent	M cu.ft.	Percent	Cords	Tons
Merchantable:						
Saw-timber stands (bd. ft. per acre)						
8,000 and over	6,200	6.1	1,640	2.3	20,400	38,800
6,000 to 7,999	2,200	2.2	730	1.0	9,000	17,200
4,000 to 5,999	4,500	4.5	1,680	2.4	20,900	39,700
2,000 to 3,999	4,500	4.5	2,170	3.0	26,900	51,300
All saw-timber stands	17,400	17.3	6,220	8.7	77,200	147,000
Pole-timber stands (cords per acre)						
10.0 and over	4,800	4.8	2,000	2.8	25,400	52,700
5.0 to 9.9	11,400	11.2	6,170	8.7	78,800	163,100
All pole-timber stands	16,200	16.0	8,170	11.5	104,200	215,800
All merchantable stands	33,600	33.3	14,390	20.2	181,400	362,800
All unmerchantable stands	67,200	66.7	56,940	79.8	759,200	1,434,800
All forest land	100,800	100.0	71,330	100.0	940,600	1,797,600

1/ Based on the International 1/4-inch rule which closely approximates green lumber tally.

Table 7.--Volume in merchantable stands by species groups

Merchantable class and species group	Saw-timber volume (lumber tally)		Total volume (including bark)					
	M bd.ft.	Percent	M cu.ft.	Percent	Cords 1/	Percent	Tons 2/	Percent
Saw-timber stands								
Conifers	8,500	48.9	3,650	58.7	42,900	55.6	75,100	51.1
Oaks and hickory	6,600	37.9	1,130	18.2	15,100	19.5	35,000	23.8
Other hardwoods	2,300	13.2	1,440	23.1	19,200	24.9	36,900	25.1
All species	17,400	100.0	6,220	100.0	77,200	100.0	147,000	100.0
Pole-timber stands								
Conifers	6,600	56.4	3,050	37.3	35,900	34.5	61,900	28.7
Oaks and hickory	3,900	33.0	4,160	50.9	55,500	53.2	128,800	59.7
Other hardwoods	1,200	10.6	960	11.8	12.800	12.3	25,100	11.6
All species	11,700	100.0	8,170	100.0	104,200	100.0	215,800	100.0
All merchantable stands	29,100		14,390		181,400		362,800	

1/ Based on 85 cubic feet per cord for conifers and 75 cubic feet per cord for hardwoods.

2/ Based on cubic feet-per-ton converting factors for the principal species.

Table 8.--Board foot volume in merchantable saw-timber stands by diameter classes and species groups

Diameter class (d.b.h.) (inches)	Conifers 1/		Oak and hickory 2/		Other hardwoods 3/		All species	
	M bd.ft.	Percent	M bd.ft.	Percent	M bd.ft.	Percent	M. bd.ft.	Percent
10	800	10.1					800	4.6
12	1,300	15.4	800	12.9	600	25.2	2,700	15.5
14	1,500	17.3	900	13.6	500	21.7	2,900	16.7
16	1,200	14.1	1,100	17.1	400	19.1	2,700	15.5
18	1,500	17.6	1,000	14.4	300	14.8	2,800	16.1
20	1,000	11.6	1,000	14.4	200	8.3	2,200	12.6
22 & up	1,200	13.9	1,800	27.6	300	10.9	3,300	19.0
All classes	8,500	100.0	6,600	100.0	2,300	100.0	17,400	100.0

1/ Principally white pine, hemlock and pitch pine.

2/ Principally white, red, and black oaks, with some hickory and chestnut, scarlet and pin oaks.

3/ Principally red maple, black birch, yellow poplar and white ash, with some walnut, aspen, black locust, sycamore, willow, basswood, elm and black gum.

Table 9.--Cubic foot volume in merchantable pole-timber stands by diameter classes and species groups

Diameter class (d.b.h.)	Conifers 1/			Oaks and hickory 2/			Other hardwoods 3/			All species		
Inches	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons
6	350	11.5	7,100	1,030	24.8	31,900	320	33.4	8,400	1,700	20.8	47,400
8	500	16.4	10,200	860	20.7	26,700	200	20.8	5,200	1,560	19.1	42,100
10	700	23.0	14,200	690	16.6	21,400	180	18.7	4,700	1,570	19.2	40,300
12	820	26.9	16,700	650	15.6	20,100	150	15.6	3,900	1,620	19.8	40,700
14 & up	680	22.2	13,700	930	22.3	28,700	110	11.5	2,900	1,720	21.1	45,300
All classes	3,050	100.0	61,900	4,160	100.0	128,800	960	100.0	25,100	8,170	100.0	215,800

1/ Principally white pine, hemlock, and pitch pine.

2/ Principally white, red, chestnut, and black oak, with some hickory, scarlet oak, and pin oak.

3/ Principally red maple, black birch, and white ash, with some yellow poplar, walnut, aspen, sycamore, willow, black locust, elm, yellow birch, red birch, basswood, black gum, and dogwood.

Table 1.--Land use

Land use	Area Acres	Proportion of class Percent	Proportion of gross area Percent
Forest 1/			
Tracts less than 10 acres	2,300	1.1	0.9
Tracts 10 up to 50 acres	6,700	3.3	2.6
Tracts 50 acres and over	195,900	95.6	75.3
All forest land	204,900	100.0	78.8
Nonforest			
Cropland 2/	28,700	52.1	11.1
Mine waste 1/	4,400	8.0	1.7
Water 2/	600	1.1	0.2
Other	21,400	38.8	8.2
All nonforest land	55,100	100.0	21.2
Gross area	260,000	100.0	100.0

1/ Based on aerial photographs taken in 1938 - 1939.

2/ Bureau of the Census, 1940.

Table 2.-- Forest area by minor civil divisions

Civil division	Gross area	Nonforest area	Forest area	Proportion gross area in forest	Proportion of county forest land
	Acres	Acres	Acres	Percent	Percent
Banks t., Beaver Meadow b.	8,100	1,200	6,900	85.2	3.4
East Penn t.	14,600	5,400	9,200	63.3	4.5
Franklin t., Parryville b., Weissport b.	10,800	5,500	5,300	49.2	2.6
Kidder t., East Side b.	47,800	1,600	46,200	96.6	22.5
Lausanne t.	3,900	800	3,100	80.5	1.5
Lehigh t., Weatherly b.	19,600	2,800	16,800	85.8	8.2
Lower Towamensing t., Bowmanstown b., and Palmerton b.	16,500	7,000	9,500	57.7	4.6
Mahoning t., Lehighton b.	17,300	10,400	6,900	39.8	3.4
Mauch Chunk t., Mauch Chunk b., Summit Hill b., East Mauch Chunk b., Lansford b.	28,400	3,500	24,900	87.6	12.2
Packer t.	20,100	3,300	16,800	83.6	8.2
Penn Forest t.	49,300	1,900	47,400	96.1	23.1
Towamansing t.	23,600	11,700	11,900	50.3	5.8
All civil divisions	260,000	55,100	204,900	78.8	100.0

1/ Abbreviations: t - township; b - borough.

Table 3.-- Forest area by forest types and conditions

Forest type	Saw-timber stands		Pole timber stands		Unmerchantable stands		All stands	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Northern hardwoods	700	7.3	6,400	19.8	17,300	10.6	24,400	11.9
Aspen - gray birch - pin cherry	--	--	300	0.9	5,100	3.1	5,400	2.6
White pine - hemlock	2,600	27.1	2,500	7.7	4,300	2.6	9,400	4.6
White pine - white oak - red oak	5,400	56.2	14,900	46.2	47,600	29.3	67,900	33.1
White oak - red oak - black oak	900	9.4	7,800	24.2	48,400	29.7	57,100	27.9
Chestnut oak	--	--	400	1.2	3,300	2.0	3,700	1.8
Scrub oak	--	--	--	--	37,000	22.7	37,000	18.1
All types	9,600	100.0	32,300	100.0	163,000	100.0	204,900	100.0

Table 4.--Volume by forest types

Forest type	Sawlog volume M bd.ft.	Total volume M cu.ft.
Sugar maple - beech - yellow birch	16,100	11,730
Aspen - gray birch - pin cherry	300	1,580
White pine - hemlock	17,100	7,430
White pine - white oak - red oak	43,700	29,680
Red oak - black oak - white oak	19,200	16,070
Chestnut oak	500	670
Scrub oak	700	1,260
Other	--	--
All forest types	97,600	68,420

Table 5.--Forest area by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Area	Proportion of each condition	Proportion of total forest land
	Acres	Percent	Percent
Merchantable:			
Saw-timber stands 1/ (bd. ft. per acre)			
8,000 and over	1,200	12.5	0.6
6,000 to 7,999	1,300	13.6	0.6
4,000 to 5,999	2,000	20.8	1.0
2,000 to 3,999	5,100	53.1	2.5
All saw-timber stands	9,600	100.0	4.7
Pole-timber stands 2/ (cords per acre)			
10.0 and over	8,700	26.9	4.3
5.0 to 9.9	23,600	73.1	11.5
All pole-timber stands	32,300	100.0	15.8
All merchantable stands	41,900		20.5
Unmerchantable:			
Saw-timber stands less than 10 acres	1,700		0.8
Pole-timber stands less than 10 acres	19,000		9.3
Young growth stands	100,200		48.9
Aspen stands	5,100		2.5
Scrub oak stands	37,000		18.0
All unmerchantable stands	163,000		79.5
All forest land	204,900		100.0

1/ In stands 10 acres or larger each acre of which has at least 2,000 board feet (lumber tally).

2/ In stands 10 acres or larger each acre of which has at least 5 cords (400 cubic feet) but less than 2,000 board feet.

Table 6.--Volume by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Saw-timber volume (lumber tally) 1/		Total volume (including bark)			
	M bd.ft.	Percent	M cu.ft.	Percent	Cords	Tons
Merchantable:						
Saw-timber stands (bd. ft. per acre)						
8,000 and over	11,500	11.8	3,160	4.6	40,400	82,200
6,000 to 7,999	7,900	8.1	2,590	3.8	33,200	67,500
4,000 to 5,999	8,500	8.7	3,210	4.7	41,100	83,700
2,000 to 3,999	13,500	13.8	6,220	9.1	79,400	161,500
All saw-timber stands	41,400	42.4	15,180	22.2	194,100	394,900
Pole-timber stands (cords per acre)						
10.0 and over	11,100	11.4	7,770	11.3	100,800	216,700
5.9 to 9.9	14,200	14.5	12,710	18.6	165,300	355,100
All pole-timber stands	25,300	25.9	20,480	29.9	266,100	571,800
All merchantable stands	66,700	68.3	35,660	52.1	460,200	966,700
All unmerchantable stands	30,900	31.7	32,760	47.9	436,800	887,700
All forest land	97,600	100.0	68,420	100.0	897,000	1,854,400

1/ Based on the International 1/4-inch rule which closely approximates green lumber tally.

Table 7.--Volume in merchantable stands by species groups

Merchantable class and species group	Saw-timber volume (lumber tally) :		Total volume (including bark)					
	M bd.ft.	Percent	M cu.ft.	Percent	Cords 1/	Percent	Tons 2/	Percent
Saw-timber stands								
Conifers	19,300	46.5	5,280	34.8	62,100	32.0	109,500	27.7
Oaks, hickory, and hard maple	13,700	33.1	4,920	32.4	65,600	33.8	151,900	38.5
Other hardwoods	8,400	20.4	4,980	32.8	66,400	34.2	133,500	33.8
All species	41,400	100.0	15,180	100.0	194,100	100.0	394,900	100.0
Pole-timber stands								
Conifers	12,800	40.4	4,420	21.6	52,000	19.5	99,100	17.3
Oaks, hickory, and hard maple	15,200	47.6	10,690	52.2	142,500	53.6	329,900	57.7
Other hardwoods	3,800	12.0	5,370	26.2	71,600	26.9	142,800	25.0
All species	31,800	100.0	20,480	100.0	266,100	100.0	571,800	100.0
All merchantable stands	73,200		35,660		460,200		966,700	

1/ Based on 85 cubic feet per cord for conifers and 75 cubic feet per cord for hardwoods.

2/ Based on cubic feet-per-ton converting factors for the principal species.

Table 8.--Board foot volume in merchantable saw-timber stands by diameter classes and species groups

Diameter class (d.b.h.)	Conifers 1/		Oaks hickory hard maple 2/		Other hardwoods 3/		All species	
inches	M bd.ft.	Percent	M. bd.ft.	Percent	M. bd.ft.	Percent	M. bd.ft.	Percent
10	2,300	11.7					2,300	5.5
12	3,800	19.5	2,800	20.3	3,200	37.4	9,800	23.7
14	3,300	17.1	3,100	22.6	1,800	21.4	8,200	19.8
16	2,300	12.1	1,900	13.7	1,500	18.3	5,700	13.8
18	2,500	12.8	1,500	10.9	900	10.7	4,900	11.8
20	1,800	9.4	1,500	11.3	300	3.8	3,600	8.7
22 & up	3,300	17.4	2,900	21.2	700	8.4	6,900	16.7
All classes	19,300	100.0	13,700	100.0	8,400	100.0	41,400	100.0

1/ Principally hemlock and white pine with some pitch pine and red spruce.

2/ Principally red, white and chestnut oak, with some hard maple, hickory and black, scarlet and pin oak.

3/ Principally red maple, yellow birch and white ash, with some beech, black birch, black cherry, walnut, yellow poplar, sycamore, willow, black locust, basswood, and elm.

Table 9.--Cubic foot volume in merchantable pole-timber stands by diameter classes and species groups

Diameter class (d.b.h.)	Conifers 1/			Oaks and hickory 2/ and hard maple			Other hardwoods 3/			All species		
Inches	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons
6	250	5.7	5,600	490	4.6	15,200	450	8.3	11,900	1,190	5.8	32,700
8	1,540	34.9	34,600	3,930	36.7	121,000	2,440	45.5	65,000	7,910	38.6	220,600
10	1,220	27.6	27,400	3,280	30.7	101,300	1,440	26.9	38,400	5,940	29.0	167,100
12	800	18.0	17,800	2,180	20.4	67,300	370	6.8	9,700	3,350	16.4	94,800
14 & up	610	13.8	13,700	810	7.6	25,100	670	12.5	17,800	2,090	10.2	56,600
All classes	4,420	100.0	99,100	10,690	100.0	329,900	5,370	100.0	142,800	20,480	100.0	571,800

1/ Principally hemlock, white pine, and pitch pine with some red spruce.

2/ Principally red, white, and chestnut oak with some black, scarlet, and pin oak, hard maple and hickory.

3/ Principally red maple, aspen, yellow birch and black birch with some white ash, black cherry, basswood, yellow poplar, walnut, sycamore, willow, black locust, elm, red birch, black gum, beech, dogwood, and gray birch.

Anthracite Survey Papers

No.	Title
1	Survey of Forest Employment Possibilities in the Anthracite Region of Pennsylvania *
2	Intensified Protection of Wyoming Valley Forests Against Fire Through Use of Community Labor*
3	Tax Delinquency of Forest Lands in the Anthracite Region of Pennsylvania**
4	Volume Tables for Commercial Timber in the Anthracite Region of Pennsylvania*
5	The Forests of Luzerne County, Pennsylvania, in relation to Employment and Welfare
6	The Population and Employment Outlook for the Anthracite Region of Pennsylvania
7	The Forest Situation in Pike and Monroe Counties
8	The Forest Situation in Dauphin and Lebanon Counties
9	The Forest Situation in Schuylkill and Carbon Counties
10	The Forest Situation in Wyoming and Sullivan Counties***
11	The Forest Situation in Northumberland, Columbia, and Montour Counties***
12	The Forest Situation in Luzerne and Lackawanna Counties***
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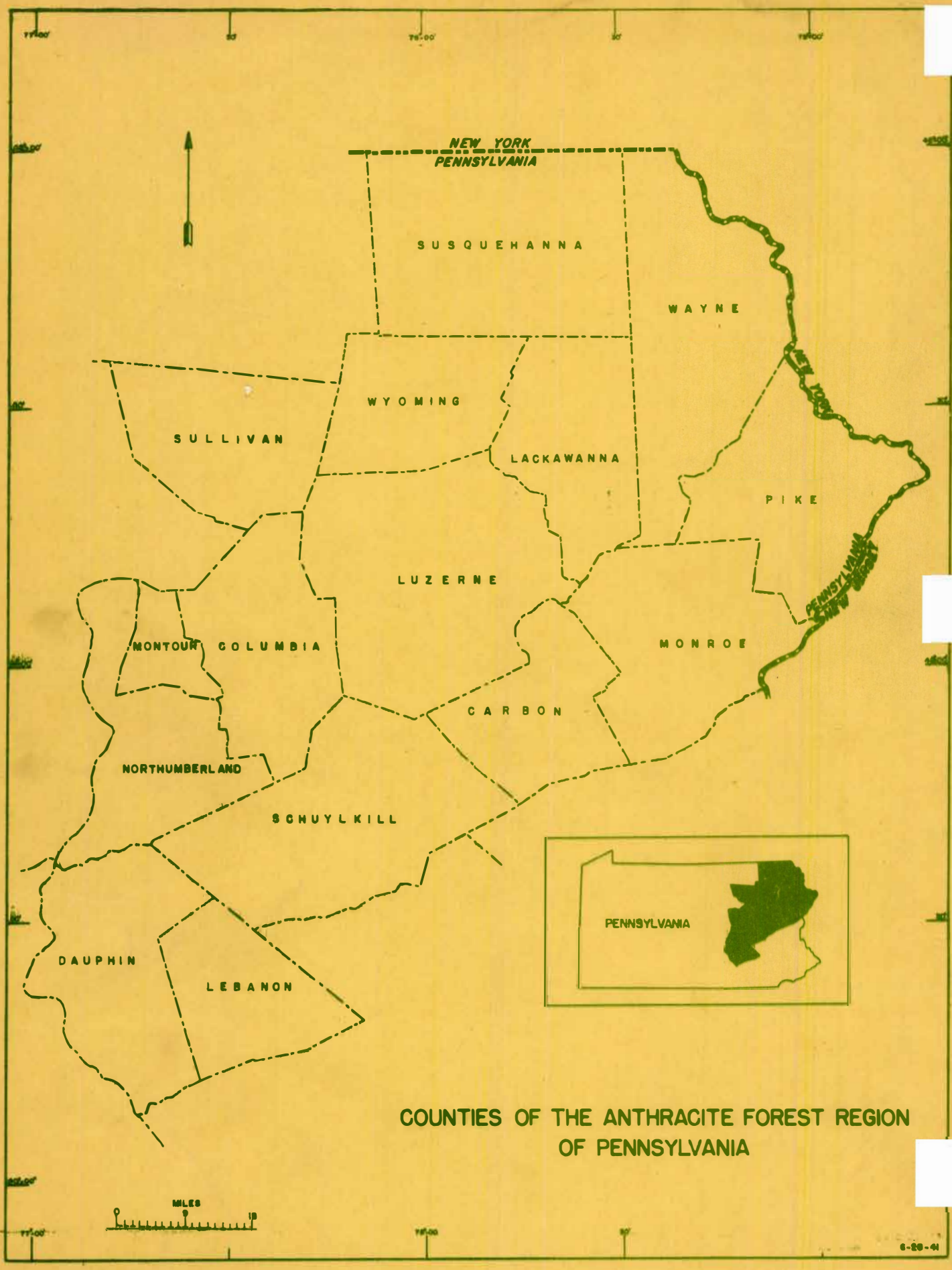

COUNTIES OF THE ANTHRACITE FOREST REGION
OF PENNSYLVANIA